

## ENVIRONMENTAL LOCATION SYSTEM

### FIELD OF THE INVENTION

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A → The present invention relates to method and apparatus for determining a location within an environment, and more particularly to a system which derives information from a plurality of passive devices; each having a predetermined location and communicating insufficient information to define the predetermined location.

### BACKGROUND OF THE INVENTION

A known radio frequency passive acoustic transponder system provides a radio-frequency surface acoustic wave on a piezoelectric substrate which interacts with elements on the substrate to produce an individualized complex waveform response to an interrogation signal. The code space for these devices may be, for example,  $2^{16}$  codes, or more, allowing a large number of transponders to be produced without code reuse. These devices consist of a piezoelectric substrate on which a metallized conductor pattern is formed, for example by a typical microphotolithography process, with a minimum feature size of, for example, one micron, and appropriate antennas and mechanical enclosures. The acoustic wave mode is often a surface acoustic wave (e.g., a Rayleigh wave), although acoustic wave devices operating with different wave types are known.

The known transponder devices thus include a surface acoustic wave device, in which an identification code is presented as a characteristic time-domain delay pattern in signal retransmitted from the transponder. Typical systems generally require that the signal emitted from an exciting antenna be non-stationary with respect to a signal received from the tag. This ensures that the reflected signal pattern is easily distinguished from the emitted signal during the entire duration of the retransmitted signal return, representing a plurality of internal states of the transponder, allowing analysis of the various delay components within the device.

In such a device, received RF energy is transduced onto a piezoelectric substrate as an acoustic wave with a first interdigital electrode system, from whence it travels through the substrate, interacting with reflector, delay or resonant/frequency selective elements in the path of the acoustic wave, resulting in specific known electro-acoustic interactions. A portion of the acoustic wave energy is ultimately received an interdigital electrode system and retransmitted. The retransmitted signal thus represents a complex delay and attenuation pattern function of the

### EXAMINER'S AMENDMENT

1. An Examiner's Amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 C.F.R. § 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the Issue Fee.
2. The following corrections in the specification have been made:
  - a. According to rules 1.126, the claims 44-46 have been renumbered as 42-44 since claims 42 and 43 are skipped.
  - b. On page 1 of the specification, the following paragraph has been inserted after the title:

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The present application is a continuation of U.S. patent application Serial No. 10/201,025 filed on July 22, 2002, now U.S. Patent No. 6,611,758, which is a continuation of U.S. Patent application Serial No. 09/902,073 filed on July 10, 2001, now U.S. Patent No. 6,424,916, which is a continuation of U.S. Patent application Serial No. 09/248,023 filed on February 10, 1999, now U.S. Patent No. 6,259,991.

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Tan Nguyen, whose telephone number is

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(703) 305-9755. The examiner can normally be reached on Monday-Thursday from 5:30 AM-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Cuchlinski, can be reached on (703) 308-3873.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

or faxed to:

(703) 305-7687, (for formal communications intended for entry)

Or:

(703) 308-8623 (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park V, 2451 Crystal Drive, Arlington, VA., Seventh Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-1113.

/tqn  
March 19, 2004

**TAN Q. NGUYEN**  
*Primary Examiner*  
*Art Unit 3661*